



JPW
AFS

PTO/SB/21 (09-04)
Approved for use through 07/31/2006. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

TRANSMITTAL FORM

(to be used for all correspondence after initial filing)

Total Number of Pages in This Submission

16

Application Number	09/881,501
Filing Date	6/14/2001
First Named Inventor	Alpern, et al.
Art Unit	2171
Examiner Name	E.P. Leroux
Attorney Docket Number	oracle01.013

ENCLOSURES (Check all that apply)

- ☐ Fee Transmittal Form
 - ☐ Fee Attached
- ☐ Amendment/Reply
 - ☐ After Final
 - ☐ Affidavits/declaration(s)
- ☐ Extension of Time Request
- ☐ Express Abandonment Request
- ☐ Information Disclosure Statement
- ☐ Certified Copy of Priority Document(s)
- ☐ Reply to Missing Parts/
Incomplete Application
 - ☐ Reply to Missing Parts
under 37 CFR 1.52 or 1.53

- ☐ Drawing(s)
- ☐ Licensing-related Papers
- ☐ Petition
 - ☐ Petition to Convert to a
Provisional Application
 - ☐ Power of Attorney, Revocation
 - ☐ Change of Correspondence Address
- ☐ Terminal Disclaimer
- ☐ Request for Refund
- ☐ CD, Number of CD(s) _____
 - ☐ Landscape Table on CD

- ☐ After Allowance Communication to TC
- ☐ Appeal Communication to Board
of Appeals and Interferences
- ☒ Appeal Communication to TC
(Appeal Notice, Brief, Reply Brief)
- ☐ Proprietary Information
- ☐ Status Letter
- ☒ Other Enclosure(s) (please identify
below):
Return postcard

Remarks

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm Name	Gordon E. Nelson, Patent Attorney, PC
Signature	/ Gordon E. Nelson /
Printed name	Gordon E. Nelson
Date	October 11, 2006

Reg. No. 30,093

CERTIFICATE OF TRANSMISSION/MAILING

I hereby certify that this correspondence is being facsimile transmitted to the USPTO or deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on the date shown below:

Signature /Gordon E. Nelson /

Typed or printed name Gordon E. Nelson

Date October 11, 2006

This collection of information is required by 37 CFR 1.5. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.



PATENT
IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
(oracle01.013)

5 **Applicant:** Alpern, et al. **Paper No.:** N/A
 Application No: 09/881,501 **Group Art Unit:** 2171
 Filed: 6/14/01 **Examiner:** E.P. Leroux

10

Title: *Redirection of misses in queryable caches*

.....

15 Commissioner for Patents
 Alexandria, VA 22313-1450

Appeal Brief under 37 C.F.R. 41.37

(1) Real party in interest

20

The real party in interest is Oracle International Corporation, the assignee of record, which is a subsidiary of Oracle Corporation, Redwood City, CA.

(2) Related appeals and interferences

25

None

(3) Status of claims

Claims 1-4 have been canceled; claims 5-24 stand rejected.

30 **(4) Status of amendments**

There have been no amendments made after final rejection.

(5) Summary of claimed subject matter

35

The claimed subject matter concerns redirection of query execution in a distributed database system made up of two or more database systems. A distributed database system that embodies the invention is shown at 201 in FIG. 2 and described beginning at page 12, line 10 of Applicants' Specification. Database system 201 includes a redirecting database system 203 and a redirection target database system 229. As is clear from page 13, lines 26-27, the term "database system" in the context of the patent application means a system that includes a query engine 205 and a database 40 220 and is thus able to independently execute a query.

There are two independent claims: claim 15, which claims the invention in apparatus form, and claim 5, which claims it in method form. Claim 15 reads as follows. Reference numbers are added for the convenience of the Appeals Board and are not intended to limit the scope of the claim:

1 **15. (currently amended)** Apparatus that redirects at least a part of a
 2 request (204) received in a particular database system (203) belonging to a
 3 distributed database system (201) to another database system (229) in the
 4 distributed database system,
 5 the apparatus comprising:
 6 a request analyzer (205, component 305) in the particular database
 7 system that determines that the request is preferably executed at least in
 8 part in the other database system; and
 9 a redirector (207) in the particular database system that redirects
 10 execution of at least the part of the request to the other database system.

Operation of the apparatus of claim 27 is described in overview at page 14, line 18 through page 15, line 10. Details of a preferred embodiment are disclosed beginning at page 14, line 11 and shown in FIG. 3.

15 Claim 5 reads as follows:

1 **5. (currently amended)** A method employed in a distributed database
 2 system that includes a plurality of database systems for responding to a
 3 request received in a particular database system of the plurality,
 4 the method comprising the steps performed during execution of the
 5 request in the particular database system of:
 6 determining whether the execution of the request is preferably
 7 done at least in part in another database system of the plurality; and
 8 if that is the case, redirecting that part of the execution to the other
 9 database system.

The claimed method is disclosed at page 12, line 23-page 13, line 14; lines 8-14 set forth a variety of situations in which redirection may occur. Detailed flowcharts for the method in a preferred embodiment are shown in FIGs. 4 and 5 and discussed beginning at page 18, line 16.

5

(6) Grounds of rejection to be reviewed on appeal

The grounds of rejection to be reviewed on appeal are the following:

- The rejection of claims 5-7, 10-16, 19-24 under 35 U.S.C. 102(e) as anticipated by U.S. Patent 6,243,715, Bogantz, et al., *Replicated database synchronization method* ..., filed 11/9/98 (henceforth "Bogantz"); and
- The rejection of claims 8 and 17 under 35 U.S.C. 103(a) as obvious over the combination of Bogantz with U.S. published patent application 2002/0065919, Taylor, et al., *Peer-to-peer caching network for user data*, filed Nov. 30, 2000 (henceforth "Taylor"); and
- The rejection of claims 9 and 18 under 35 U.S.C. 103(a) as obvious over the combination of Bogantz with U.S. Patent 5,806,074, Souder, et al., *Configurable conflict resolution in a computer implemented distributed database*, issued 9/8/98 (henceforth "Souder").

(7) Argument

Overview

The main issues between Applicants and Examiner are the meaning of the term "distributed database system" as used in Applicants' main claims and whether Bogantz discloses what is claimed in independent claims 5 and 15. The *Argument* will begin with a discussion of the meaning of the term "distributed database system" in Applicants' , will continue with a discussion of what Bogantz discloses and conclude with demonstrations that Bogantz does not disclose all of the limitations of claims 5 and 15, that Bogantz also does not disclose the added limitations of claims 6 and 19 and 7 and 16, that Taylor does not disclose the added limitations of claims 8 and 17, and that Souder does not disclose the added limitations of claims 9 and 18.

The meaning of the term "distributed database system"

In his final Office action of 5/19/06 (henceforth "Final Office Action"), Examiner argues that since Applicants' Specification does not define the term "distributed database system", Examiner is free to interpret the term as

A database implemented on a network. The component partitions are distributed over various nodes (stations) of the network. (final Office action of 5/19/06, page 7)

Examiner is *not* free to interpret the term in the above fashion. As set forth at MPEP 2111,

During patent examination, the pending claims must be "given their broadest reasonable interpretation *consistent with the specification*." > (MPEP 2111, Rev. 5, August 2006, p. 2100-37) (emphasis added)

5 Applicants have pointed out in the *Summary of claimed subject matter, supra*, that the term "database system" in the context of the patent application means a system that has a database and a query engine and is therefore capable of performing queries independently. Examiner must consequently interpret Applicants' "distributed database system that includes a plurality of database systems" not simply as a
10 "database implemented on a network" but rather as a database system that itself includes database systems. As for "distributed", as pointed out at page 10, lines 10-12 of Applicants' Specification, one of the main purposes of replicated views and queryable caches is to move database objects closer to the consumer of the objects. "Distributed" thus further includes the possibility that the database systems in
15 Applicants' distributed system may be at different geographical locations.

The disclosure of Bogantz

One issue with regard to the disclosure of Bogantz is whether Bogantz discloses a "distributed database system that includes a plurality of database systems", as
20 required by Applicants' independent claims. Another issue is whether Bogantz discloses "determining whether the execution of the request is preferably done at least in part in another database system of the plurality" or "redirecting that part of the execution to the other database system".

25 Bogantz discloses a database system that includes a plurality of databases rather than Applicants' "distributed database system that includes a plurality of database systems"

At col. 1, lines 14-16, Bogantz defines the kind of database system he discloses:

30 a replicated database *system* is a database system that comprises a plurality of *databases* each having an identical set of records. (emphasis added)

Throughout his disclosure, Bogantz describes his system in the above fashion, as a *database system* having a plurality of *databases*.

35

Bogantz' FIG. 1 shows a replicated database system of the kind he discloses. The description begins at col. 1, line 38:

5 The database system 10 comprises a plurality of replicated databases 11-13, a database provisioning system 14 and a database querying system 16.

That Bogantz' replicated database system is not Applicants' "distributed database system that includes a plurality of database systems" is immediately apparent from the fact that there is a *single* database querying system 16 in FIG. 1. It is described as follows beginning at col. 1, line 49:

10 The database querying system 16 is configured to retrieve specific records from the databases 11-13 as requested by one of a number of database users 18 accessing the database system 10. The actual database accessed by the database querying system 16 is transparent to the database user because the database querying system 16 determines the replicated database to which it sends the data request/query. As with most replicated database systems, the database querying system 16 may choose a different database for subsequent requests of the same data such that there is a need for database synchronicity.

20 The single querying system is a strong indication that Bogantz' system is exactly what he terms it: a database system with a plurality of databases. One of the consequences of this fact is that database querying system 16 does all of the querying; as set forth at col. 6, lines 59-65, redirection in Bogantz is not redirection from one database to another, but rather redirection from a database back to database querying system 16.

As will be apparent from even the most cursory comparison of Applicants' FIG. 1 or FIG. 2 with Bogantz' FIG. 1, there is nothing in Applicants' "distributed database system that includes a plurality of database system" that is in any way comparable to the single querying system 16 of Bogantz' FIG. 1. The reason that there is nothing like querying system 16 in Applicants' "distributed database system" is because, as set forth at p. 13, lines 26 and 27, each of the component database systems has its own query engine 205. Indeed, a separate database querying system makes no sense whatever in a distributed database system whose component database systems may be geographically distributed.

Another indication that Bogantz' system is indeed a database system with a plurality of databases is Bogantz' *single* database provisioning system 104. There is again

nothing in Applicants' FIGs. 1 or 2 that corresponds to Bogantz' database provisioning system 104, and given that Applicants' database systems may be geographically distributed, such a single provisioning system makes no sense.

5 Bogantz does not disclose "redirecting that part of the execution to the other database system"

As indicated above, redirection in Bogantz is not from one of his databases to another of his databases, but rather from one database to querying system 106. Querying system 106 then repeats the query on the other database.

10

Redirection in Bogantz is used for a single specialized purpose: to ensure that database synchronicity is maintained while the database is being provisioned. As set forth at col. 1, lines 29-33, database synchronicity requires that the database system users have a consistent view of the data independent of which of the replicated
15 databases may be accessed. This problem is solved as described at col. 6, line 42-col. 7, line 10:

20 A record being updated with update data is called a record in transition. According to the present invention, database synchronization is achieved by having those query messages which access a record in transition routed to a specific database that has already been updated or will be updated. By having those queries that access records in transition redirected and processed by a specific database, data synchronicity (consistency) from the perspective of the database user is assured.

25

The provisioning system processor 110 is programmed so that when a record in each of the databases 101-103 needs to be updated, the provisioning system 104 selects one of the databases 101-103 as the requery or selected database (SDB). The remaining databases are referred to as non-selected databases (NSDBs). Accordingly, any
30 queries from the querying system 106 that access records that are in the process of being updated are redirected to the selected database. If during query processing by the database queried by the querying system 106, it is determined that the record that the user requested is being updated by the provisioning system 104, the queried database
35 will halt processing of the request and launch a request back to the database querying system 106 to transmit this query to the specified selected database. The requery is completely transparent to the user.

40

The pointer field in each record is used to indicate that an update is in progress. A non-zero value in the pointer field indicates that an update of the record is in progress. The non-zero value actually corresponds to

the index of the current selected database. Accordingly, if the pointer field of a record being queried has a non-zero value, the database will halt processing of the query and launch a request back to the querying system 106 to send the query to the selected database indicated by the pointer field. The pointer field therefore performs the dual function of indicating that the record is being updated and identifying the database which is the selected database.

As can be seen from the above, Bogantz' databases 102 don't actually do redirection. What they do is simply return a value in response to a query from database querying system 106. Each record in the database has a pointer field as well as fields containing other data. A record's pointer field is set to a pointer value only if the record belongs to a set of records that are to be updated and the pointer value remains set until all of the records in the set have been updated. If the pointer field has a pointer value, the database returns a requery signal and the pointer value; otherwise it returns the other data. The pointer value indicates a database 102 that contains the record's old value, and database querying system 106 responds to the requery signal and the pointer value by repeating the query on the database specified by the pointer (Bogantz, col. 7, lines 47-58). Thus, what is disclosed in Bogantz is not redirection from a first database system to a second database system, with the redirection being performed within the first database system, but rather redirection performed in a *single* database system from a first database belonging to the database system to the database system's querying system, which then repeats the query on another database belonging to the database system.

25

The rejection of claims 5-7, 10-16, and 19-24 under 35 U.S.C. 102

Rejection of a claim under 35 U.S.C. 102 requires that the reference which provides the basis for the reference show all of the limitations of the claim being rejected. As demonstrated above, Applicants' claims 5-7, 10-16, and 19-24 *must be interpreted as* being addressed to methods that are practiced in and apparatus that is employed in "a distributed database system that includes a plurality of database systems". Bogantz, however, does not disclose "a distributed database system that includes a plurality of database systems", but rather, as set forth in the reference itself, "a database system that comprises a plurality of databases". Consequently, none of claims 5-7, 10-16, and 19-24 is anticipated by Bogantz.

35

Continuing in more detail, as would be expected from the differences between a system that is a single database system with a plurality of databases and a system that is a distributed database system that includes a plurality of database systems, Bogantz' database system cannot perform the method steps of Applicants' claim 5 and does not include the request analyzer and redirector of claim 15.

Beginning with claim 5, at the simplest level, the first method step of the claim, at lines 6 and 7, requires that "the execution of the request [be] preferably done at least in part in another database system of the plurality". As set forth above, there is neither a "particular database system" nor an "other database system" in Bogantz.

At the next level, if Bogantz' databases are taken to be Applicants' database systems, as Examiner does in his interpretation of claim 5 on page 3 of the final Office action, then Bogantz' databases must "determine whether the execution of the request is preferably done at least in part in another [database] of the plurality". They in fact do no such thing. A database in Bogantz' system *always* executes every request it receives from database querying system 106 (FIG. 2). If the pointer value in the queried record is set, it returns the pointer value and a requery signal; if the pointer value is not set, it returns the other information in the record. The only difference between a query to a record that is not being updated and a query to one that is being updated is that the database returns the pointer to the database that will be updated first or last to the database querying system instead of the record's other data.

Continuing with the second method step, at lines 8 and 9, again, there is no "other database system" disclosed in Bogantz, and consequently, redirection to an "other database system" is not disclosed. Further, if Bogantz' databases are taken to be Applicants' database systems, as explained above, when a database in Bogantz' system receives a query to a record that is being updated, it returns the pointer to the database that will be updated first or last to database querying system 106, which then uses the pointer to repeat the query on that database. The database thus does not "redirect that part of the execution to the other database system", as required by the claim.

In summary, then, if it is agreed that Bogantz' databases are not Applicants' database systems, then Bogantz does not anticipate claim 5; if that premise is not accepted and

the claim is read as though Bogantz' databases are Applicants' database systems, then Bogantz does not perform the method steps set forth in the claim. As the Board will immediately see, the arguments made with regard to claim 5 apply *mutatis mutandis* to claim 15 as well.

5

Rejections of the dependent claims under 35 U.S.C. 102

As the Board understands, if independent claims 5 and 15 are not anticipated by Bogantz, neither are claims 6-7, 10-14, 16, and 19-24, which are all dependent from either claim 5 or claim 15. Additionally, however, certain of the dependent claims
10 contain limitations that are not disclosed in Bogantz, and those claims are patentable in their own rights over the reference.

Claims 6 and 19

These claims add the limitation that the step of determining “determines that an object
15 required for execution of the request is lacking in the particular database system”. In his rejection of these claims, Examiner refers Applicants to col. 6, lines 42-50, which merely disclose that query messages which “access a record in transition” are returned to querying system 206 for rerouting. The “record in transition” is of course still in the database, so what is detected is not that the object “is lacking”, but that though
20 present, it is in transition and therefore *cannot be used*. Consequently, Bogantz does not disclose the added limitation of these claims.

Claims 7 and 16

The added limitations here are that the particular database system “places the request
25 in a form required for execution in the particular database system” and then modifies the form when it has been determined that redirection is required. In his rejection, Examiner refers to reference number 110 in a non-existent FIG. 3. Reference number 110 is a processor in provisioning system 104 (FIG. 2) which determines which of the databases is the selected database and then causes the pointer to the selected database
30 to be set in the records in transition. In applicants' claims 7 and 16, it is the “particular database system” that is performing the method step, and what is being modified is the *request*, not a field in a record that may be retrieved by the request. Bogantz therefore also does not disclose the added limitations of these claims.

The rejections under 35 U.S.C. 103

These rejections all combine Bogantz with additional references to obtain all of the limitations of the dependent claim being rejected. Since Bogantz does not show all of the limitations of the claims from which the rejected claim is dependent, Examiner
5 has not made his *prima facie* case of obviousness and the rejections under 35 U.S.C. 103 are without foundation.

Claims 8 and 17

Additionally, with regard to claims 8 and 17, the added limitations are that “the
10 request includes an SQL statement” , that “the form required for execution is a cursor” and that “the cursor is marked for redirection”. All that Taylor discloses about any of this is the following:

15 [0171] Database **801** is an SQL database, which may be generated by any of a number of commercially available applications (e.g., Oracle). In Database **801**, User Column **802** contains names or other identifiers corresponding to users who have data stored in the database. Password Column **803** contains a password for each of the users listed in User Column **802**. Data Fields **804** contain data, also
20 corresponding to the user listed in the corresponding field in Column **802**. Again, Database **801** is simplified for purposes of illustration, since multiple records of data might be associated with each user.

25 Consequently, Examiner has not made his *prima facie* case with regard to claims 8 and 17.

Claims 9 and 18

The added limitations here are that the request “includes a call to a procedure object”
30 and “the call is rewritten in the form required for execution as a remote procedure call directed to the other database system.” The total disclosure concerning these limitations in Souder is the following:

35 Typically, remote accesses between nodes are performed using a conventional data manipulation language such as SQL or other conventional protocol. Alternatively, the remote database can use a remote procedure call (RPC) to activate a data access procedure on the local database in a synchronous RPC context. In a synchronous context, the remote database waits for the RPC to finish before completing the transaction. An RPC can also be used to queue a

request on the local system in an asynchronous RPC context. In an asynchronous context, the remote database does not wait for the RPC to finish before completing the transaction. The use of a remote procedure call is well known to those of ordinary skill in the art.

There is nothing whatever here about *rewriting* a call to a procedure object as a remote procedure call, as required by the limitations. Consequently, Examiner has not made his *prima facie* case with regard to claims 9 and 18.

Conclusion

In the foregoing, Applicant has complied with the requirements of 37 C.F.R. 41.37 with regard to his brief and has demonstrated in his *Argument* that Bogantz does not disclose all of the limitations of any of Applicants' claims that Examiner has rejected under 35 U.S.C. 102 and that the combinations of Bogantz with the other references do not disclose all of the limitations of any of Applicants' claims that Examiner has rejected under 35 U.S.C. 103. That being the case, the rejections cannot stand and Applicant respectfully requests that the Board of Appeals reverse Examiner with regard to all of his rejections and remand the application to the examiner for further processing as indicated by the reversals. A check for \$500.00 for the appeal fee is attached.

Respectfully submitted,
/Gordon E. Nelson/
 Attorney of record,
 Gordon E. Nelson
 57 Central St., P.O. Box 782
 Rowley, MA, 01969,
 Registration number 30,093
 Voice: (978) 948-7632
 Fax: (866) 723-0359
10/11/06
 Date

Certificate of Mailing

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to:

Assistant Commissioner for Patents
 Washington, D.C. 20231

on 10/11/06
 (Date)
 Gordon E. Nelson, #30,093
/Gordon E. Nelson/

(8) Appendix of claims

1 **1. (canceled)**

1 **2. (canceled)**

1 **3. (canceled)**

1 **4. (canceled)**

1 **5.** A method employed in a distributed database system that includes a plurality of
2 database systems for responding to a request received in a particular database system
3 of the plurality,
4 the method comprising the steps performed during execution of the request in the
5 particular database system of:
6 determining whether the execution of the request is preferably done at least in
7 part in another database system of the plurality; and
8 if that is the case, redirecting that part of the execution to the other database
9 system.

1 **6.** The method set forth in claim 5 wherein:
2 the request includes one or more specifiers referring to objects belonging to a
3 plurality thereof in the distributed database system; and
4 the step of determining whether the execution of the request is preferably done
5 in the other database system determines that an object required for execution of the
6 request is lacking in the particular database system.

1 **7.** The method set forth in claim 5 further comprising the steps of:
2 placing the request in a form required for execution in the particular database

3 system;
4 modifying the form when it has been determined that the request is preferably
5 executed at least in part in the other database system; and
6 in the step of redirecting, the modified form is redirected.

1 **8.** The method set forth in claim 7 wherein:
2 the request includes an SQL statement;
3 the form required for execution is a cursor; and
4 in the step of modifying the form, the cursor is marked for redirection.

1 **9.** The method set forth in claim 7 wherein:
2 the request includes a call to a procedure object; and
3 in the step of modifying the form, the call is rewritten in the form required for
4 execution as a remote procedure call directed to the other database system.

1 **10.** A data storage device, characterized in that:
2 the data storage device contains code which when executed by a processor
3 performs the method set forth in claim 5.

1 **11.** A data storage device, characterized in that:
2 the data storage device contains code which when executed by a processor
3 performs the method set forth in claim 6.

1 **12.** A data storage device, characterized in that:
2 the data storage device contains code which when executed by a processor
3 performs the method set forth in claim 7.

1 **13.** A data storage device, characterized in that:
2 the data storage device contains code which when executed by a processor
3 performs the method set forth in claim 8.

- 1 **14.** A data storage device, characterized in that:
- 2 the data storage device contains code which when executed by a processor
- 3 performs the method set forth in claim 9.
- 1 **15.** Apparatus that redirects at least a part of a request received in a particular
- 2 database system belonging to a distributed database system to another database
- 3 system in the distributed database system,
- 4 the apparatus comprising:
- 5 a request analyzer in the particular database system that determines that the
- 6 request is preferably executed at least in part in the other database system; and
- 7 a redirector in the particular database system that redirects execution of at least
- 8 the part of the request to the other database system.
- 1 **16.** The apparatus set forth in claim 15 wherein:
- 2 the request analyzer places the request in a form required for execution in the
- 3 particular database system and causes the form to be modified when the request is
- 4 preferably executed at least in part in the other database system; and
- 5 the redirector redirects the modified form.
- 1 **17.** The apparatus set forth in claim 16 wherein:
- 2 the request includes an SQL statement;
- 3 the request analyzer includes the SQL statement in a cursor that the request
- 4 analyzer causes to be marked for redirection; and
- 5 the redirector redirects the marked cursor.
- 1 **18.** The apparatus set forth in claim 16 wherein:
- 2 the request includes a call to a procedure object; and
- 3 the redirector causes the call to be rewritten in a form required for execution as
- 4 a remote procedure call directed to the other database system.
- 1 **19** The apparatus set forth in claim 15 wherein:

2 the request includes one or more specifiers referring to objects belonging to a
3 plurality thereof in the distributed database system and
4 the request analyzer determines that an object required for execution of the
5 request is lacking in the particular database system.

1 **20.** A data storage device, characterized in that:

2 the data storage device contains code which when executed implements an
3 apparatus as set forth in claim 15.

1 **21.** A data storage device, characterized in that:

2 the data storage device contains code which when executed implements an
3 apparatus as set forth in claim 16.

1 **22.** A data storage device, characterized in that:

2 the data storage device contains code which when executed implements an
3 apparatus as set forth in claim 17.

1 **23.** A data storage device, characterized in that:

2 the data storage device contains code which when executed implements an
3 apparatus as set forth in claim 18.

1 **24.** A data storage device, characterized in that:

2 the data storage device contains code which when executed implements an
3 apparatus as set forth in claim 19.